January, 1955

THE CHEMIST

VOLUME XXXII NUMBER 1

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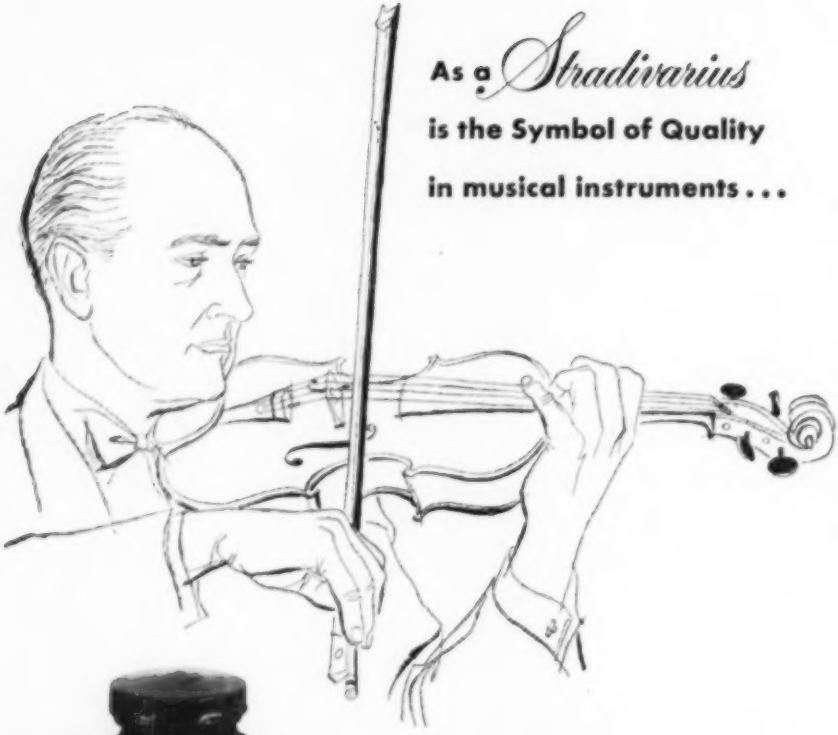

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TO COME IN FEBRUARY

Dr. Arthur Osol, F.A.I.C., who received the Honor Scroll of the Pennsylvania Chapter, Dec. 2, 1954, will tell us about "Teaching — Chemistry's Most Rewarding Opportunity." Dr. Ivor Griffiith, F.A.I.C., will tell us about Dr. Osol's career. "The Promising Field of Fluorochemicals," an article by R. M. Adams, may stimulate those who look ahead to the industrial developments of tomorrow. Other news and information will appear.

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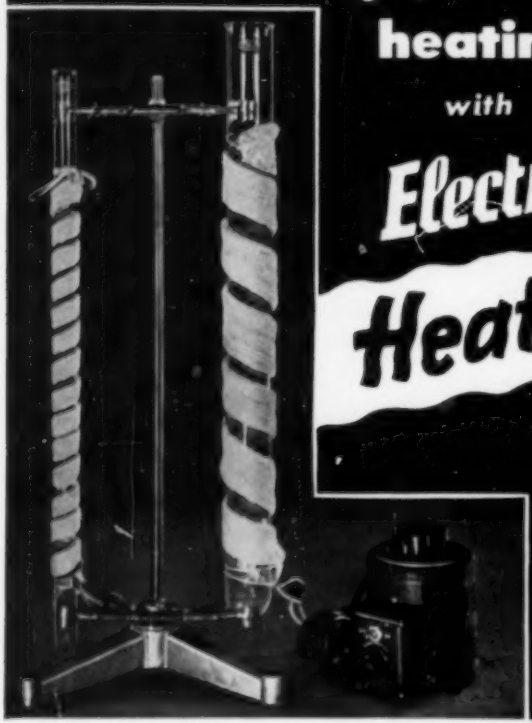

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EDITORIAL

The Right to Work

Dr. Donald B. Keyes

President, The American Institute of Chemists, Inc.

THIS "Bedtime Story" editorial is directed to the chemist or chemical engineer who can qualify but who is not a member of THE AMERICAN INSTITUTE OF CHEMISTS. Please show it to him.

Let us suppose that you have received an attractive offer but your potential employer closes his remarks to you as follows:

"Now, Son, I must tell you we operate an 'Institute Shop', that is, you must join the 'Institute' within thirty days after you come with us, or get fired. Don't worry about paying your 'Institute' dues, we take the amount, 'a modest $50.' from your pay check and do it for you. This free service to you is known as the 'check-off system'. Now please see the 'Local Institute Boss' who will answer any questions you may have."

You stagger out and locate the "Man of Distinction", the "Institute's" representative. This elegant gentleman with a pleasant smile tells you in soothing tones that no "gentleman" wants to be a "free rider"; that the "Institute" has grown from 2700 to 270,000 just because it has done so much for its members; that in another year or two you will receive so many "fringe benefits", due to the "Institute" activities, you will look "fuzzy"; and that a law may be passed with "Institute" help establishing a minimum *yearly* wage for you. Think what this might mean to you — when not working, a *paid* vacation in Florida or Maine depending upon the season. Of course in the meantime, the company may go broke. So what? You don't own it!

Once more you stagger out into the sunshine or the smog as the case may be. Fortunately you meet a friend who tells you about certain states where your freedom to work without joining the "Institute" is still protected by law. You leave quickly.

Now, my Non-member Friend, please tell me what chemical group, other than THE AMERICAN INSTITUTE OF CHEMISTS, is fighting to make certain that you will always have the right to work where you choose!

Established: By the American Society of Mechanical Engineers, 29 W. 39th St., New York 18, N. Y., a Nuclear Engineering Committee to coordinate the Society's activities in "those areas of mechanical engineering in which a knowledge of nuclear physics is essential."

Announced: By Earl P. Stevenson, F. A. I. C., president of Arthur D. Little, Inc., Cambridge, Mass., the addition of William T. Nichols, formerly with Monsanto and Westvaco, to the staff.

Resigned: Edward M. James, F.A.I.C., as technical advisor to Lever Brothers Company, to enter the field of private consulting work. He is past president and member of the Governing Board of the American Oil Chemists Society, and is a specialist in the field of edible oil refining and processing. His offices are maintained at 410 Swarthmore Ave., Swarthmore, Pa.

Appointed: Charles Gardner, F.A.I.C., as sales manager, Drier Div., Witco Chemical Co., 260 Madison Ave., New York, N. Y. He was formerly with Advance Solvents & Chemical Corp.

Vault of the Future: Sealed for opening in 1964, featured the dedication of the new $500,000 plant of Permatex Company, Inc., in Kansas City, Kansas, October 19, 1954. Predictions sealed in the vault included ten years of peace and unprecedented scientific and economic progress for the United States; a 26-hour work week, solution of the riddle of cancer, a 170,000,000 population, sterilization of much of food by atomic radiation; a doubling of the production of chemicals from petroleum, and the use of some form of atomic energy in motor vehicles. The new plant will double the company's present production capacity of sealing compounds and maintenance chemicals for transportation industries.

Appointed: Dr. Max Bender, F.A.I.C., as assistant professor at Adelphi College. He will teach colloid chemistry in the graduate evening program. He is a senior research chemist at the Research Division of American Cyanamid Company, Bound Brook, N. J., and he is chairman of the Program Committee of the New Jersey AIC Chapter.

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HAROLD C. UREY

Distinguished Service Professor of Chemistry
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Scientists, Secrets and Security

Dr. Harold C. Urey

Institute of Nuclear Studies, University of Chicago, Chicago, Ill.

(Acceptance address when the author received the Honor Scroll of the Chicago AIC Chapter at a dinner on Oct. 8, 1954, in Chicago, Ill.)

THE PROBLEMS covered by the subject of this paper have plagued scientific people ever since the war, and all of us have hoped that in some way sane and sensible discussion of the subject would be possible. As time has passed, we have observed that the annoying procedures of war time have grown to be far more irritating, and the discussion of the subject by the press and public seems to me to become less and less rational. This is probably partly because the public does not understand the nature of scientific facts, but also I suspect it is because of the decreased security of this country relative to foreign attack that has occured during this century. We are all appalled by the dangers to us arising from the invention of nuclear weapons and the development of aeroplanes during this century. The continuous developments in both fields with no very obvious limitations in the future have given the people of this country a first class case of hysteria.

I believe we as a nation are in a more dangerous position than we have ever been in since the time of our own Revolution. There is an implacable enemy to our way of life in the world today. We are not at all the only people who face this situation; some other democratic countries are in even more dangerous positions than we are. But to us the situation is a new one, whereas it has been almost a normal one for some other countries, for example, in western Europe. For this reason we may become much more perturbed than they do. Also, it may be that people do not discuss such imminent dangers as those of western Europe continuously, whereas people who are somewhat more removed, as we are, find that it is possible to discuss them just because it may be possible to do something constructive about them. However this may be, the discussion of our difficult world situation is continuous in this country, and much of the discussion deals with trivia rather than with the really important problems of the situation. At the same time our position as the most powerful nation of the free world requires that we do consider these problems with courage and calmness.

The Problem of Security

By security I mean some degree of safety for this country against military attack from without, violent re-

volution from within, and subversion of our democratic institutions by other means. This broad security is a very complicated problem and depends on almost all activities of people within the country. To review all factors of this security would require a very large document, but I wish to outline some features of security in order to discuss scientists and secrets in a proper perspective.

The 19th Century was the golden age of the United States from the standpoint of external attack. The Atlantic and Pacific Oceans were extremely broad in those years, and we were indeed isolated. Then isolationists had all the arguments on their side. We also were not endangered by any foreign revolutionary ideas. As a matter of fact, we were the revolutionary idea of the century and were greatly feared on this basis by some other countries. In fact the ideas of our Revolution resulted in important changes in governments in Europe. But this disturbed us not at all and we viewed these changes in much the same way that Communists view the spread of their doctrines today. We really were happy about the whole thing. But today our isolated military position is gone. It went at the turn of the century with the invention of the aeroplane, and today we fear attack from across the Arctic Ocean. Who would have dreamed of this when a machine flew at Kitty Hawk? None of us really realized this until somewhat later, and many people today act and talk as though we were living in the happy days of 1900. Also, a new revolutionary set of ideas has come to prominence in the world, and I am sure that we belong to the conservatives in connection with these ideas. I believe that our old revolutionary ideas are superior to the new and that they will serve the world in the future as they have in the past.

It is impossible to talk of external and internal security of a country unless certain fundamental conditions exist. A certain social, political, and economic stability must exist within the country. This depends on the psychological state of the people of the country and such a state depends on their past history, their cultural history, and their religion. It is a sort of internal feeling of well being of the body politic, analogous to a similar feeling on the part of the individual citizen. Political, religious, and economic arguments must not become too violent and there must not be a widespread feeling that great injustice exists for a substantial fraction of the population.

Such a satisfactory condition exists in this country and many other free countries of the world. Some people in this country have been very angry at some governmental developments of the last 20 or 25-years, but I do not believe that these cries of treason really represent a deep-seated split in

the population. On the other hand, the situations that exist in France and Italy do come close to causing great weakness in these countries. Nothing remotely approaching such a situation exists in this country. We will always have extremists of various kinds, but as long as the overwhelming majority regard conditions as acceptable even if decisions are not always as they would like, we have a secure basis from which to construct our external and internal security. (I wish sometimes that fewer people talked as though this essential stability in this country did not indeed obtain.)

In particular, the United States is exceedingly stable with regard to Communist ideas and philosophy. We probably have some 25 or 50-thousand Communists in this country and about ten times this many people who are insane enough to be confined in institutions. We also have a considerable number of people who would readily subscribe to a totalitarianism of the right. But all categories of such people are very limited in number. There is not the remotest possibility of the number of Communists increasing in any important degree. Communism appeals to people who are socially and economically on the wrong side of the railroad tracks, i.e., without satisfactory jobs, social position and opportunities. There just is a vanishing small fraction of our people who are in this situation or who do not see the unfavorable situations changing.

I feel less certain about our fanatics of the right, perhaps because I do not know what it is that makes them what they are. Why are people who are on the right side of the tracks socially and financially sometimes antisemites and antiminority groups generally, and why are they willing to discard all democratic procedures in order to attain ends which really do not benefit them at all but make other people miserable? Why did Hitler wish to exterminate six-million Jews?

But in spite of these insane groups at the fringes, this country is solidly middle of the road democratic, and I do not believe that these minority groups have any possibility of undermining this country. I am not concerned about our teachers, our political leaders, our religious leaders, or anything in this connection. All imperfections are minor and of small consequence. I emphasze this as strongly as possible and I wish the people of this country could be brought to realize it. Their approach to all problems would become more confident and more sensible. In this troubled world situation we "lead from strength."

But in other non-military ways we have considerable strength. The ideas of our own Revolution have partly influenced much of the free world as other countries and peoples have

spontaneously evolved along similar lines. Our ties to the British Commonwealth of Nations are very genuine even if entirely informal. Similarly our ties to the free countries of western Europe are very strong. My wife, my son, and I have just returned from two months in Norway, Sweden, Denmark, France, and Italy. We liked the people, the food, the cathedrals and antiquities. But most of all, we found the general political conditions so similar to those in our own country. The police will protect us and not persecute us. If we ran afoul of the law, we would get very similar treatment to that given us here. We moved freely about the cities and countries. During the last centuries these countries and others have moved along very similar lines of development to those followed by ourselves. We are allies in very fundamental ways. We cherish the same political customs, the same religious views, the same literature and art, and look back to the same ancient historical cultures of Greece, Rome and the Hebrews as the inspiration of our own. We also have endured recent wars together. We are trying desperately to construct measures of mutual defense against militant and tyrannical Communism. Our attachment to these people is an important part of the 20th Century security of the United States.

Since the war, I have devoted some effort toward extending the American revolutionary idea of federalism to these western democratic countries. . . . It seems to me that most of our international problems could be handled more effectively if the western democracies created a united super-government of limited powers of a federal type to take care of defense of all our liberties. Much support for the Atlantic Union idea exists in this country. Senator Kefauver has been a staunch supporter of this idea and was attacked in his recent campaign for his stand. His last words to the people of the state of Tennessee on the night before election were, "I am for Atlantic Union." He won over his opponent two to one. I am sure that France and western Germany would both join such a union, whereas it has proved to be impossible to get the French into E.D.C. We Americans should have our own revolutionary ideas based on our own history. They could be extended to a wider community and would give us greater security.

Finally, we should mention the purely military contributions to security. Without this I am convinced that no security exists for this country in the middle of the 20th century. It is unnecessary in this group to emphasize its importance. India may accomplish much by passive resistance, but I do not believe this will suit us in the slightest. And military matters involve some things

which are scientific and engineering in character as do, as we well know, most of our non-military activities. And this circumstance brings us into the problems of secrecy.

No scientist of my acquaintance questions the need and advisability of keeping secret information that pertains to military matters. The difficulty arises in regard to the line where secrecy begins and in regard to the amount of effort which should be put into keeping scientific things of this sort secret. It is always a losing battle, for all scientific knowledge can be learned independently by a technically advanced enemy, quite independently of any leak of information from us. It may also be said that espionage can supply no information to people who have no technical knowledge. The Russians seem to have discovered the cheap hydrogen bomb before we did (my authority is Sir Francis Simon). Such people can profit from espionage. On the other hand, the Indians of the Amazon Valley could be supplied with any amount of information and would learn nothing. Only if a country has approximately sufficient technically trained men to discover things for themselves is it possible to transmit valuable knowledge to them. Mostly the Russians developed their own bombs.

What fraction of our effort should be concerned wih keeping our military scientific secrets really secret? This entire address up to this point has been given with the idea of making an estimate. Security for this country depends on many things of a non-military character. Of the military category only a part concerns technical matters. Of technical matters much deals with the operation of machines of many kinds and these are kept secret only partially at best because of the large number of people involved. Much of scientific effort must be devoted to discovering, inventing and developing new defensive and offensive devices. Interference with these efforts costs us dearly from the standpoint of security.

I suggest that less than one per cent of the personnel of a military research laboratory should be concerned with all the mechanical details of keeping information secret. I rather think that this may be a proper estimate of what effort is devoted to this problem. Also I suggest that the appropriations for the F.B.I. are large enough to deal with subversives, etc. In fact, I believe this agency could do a better job if some of the investigative duties assigned to them were discontinued. The entire field of secrecy, either of scientific or non-scientific matters, should not concern the average American citizen to more than about one per cent of the time that he gives to his responsibilities as a citizen. He should rather give his attention to the problem of a substitute for E.D.C. in Europe, a proper

solution to the Indo-China problem, a proper foreign policy for the United States, etc. How many of our citizens do this? How many of us have devoted ninety-nine per cent of our attention to governmental problems to questions of this kind during the past year? I for one have not. I have thought and talked about — well, you know what. The same things that you talked about.

The problem of proper secrecy in military matters exists. It is a small problem in the overall problem of security for this country.

Incidentally, much attention is given to this problem, but I wonder if the attention is mostly not due to our sadistic tendencies? The Romans liked gladiatorial combats. We really enjoy in a way seeing the wicked or perhaps even the innocent suffer. I feel sure that the attention in the press given to accusations against people, whether true or false, is due to our basic cruelty. Isn't it at least partly a substitute for the Roman arena that we seek?

Don't misunderstand me! I believe that the importance of secrecy and espionage is greatly exaggerated. However, I have no illusions in regard to the detrimental effects of this exaggeration on our own activities and our position of leadership in the world. We are being laughed at by some and almost abhorred by others whose good opinions we need, and indeed had a short time ago.

Some Problems of Importance in Science and Security

Among all the diverse problems relating to this important problem of security for this country at this time, there are some that we as scientists should think about. Many of our fellow scientists in spite of public criticism do continue patiently to study military technical problems without expecting or receiving public recognition or any additional financial reward. These efforts we hope will be negative, i.e., that the devices will never be used. Still the work must be done.

But I often wonder how long this will continue to be true as case after case of denied clearance occurs. This has been going on for a long time. Many little people have been denied clearance and mostly we hear nothing about them. Sometimes the men have appealed to me for help and I have never known of anything I could do. For years Dr. Edward Condon has been forced to defend himself against public accusations and in formal clearance hearings, but he has always been cleared for secret work as far as I know. The most celebrated case is that of Dr. Oppenheimer. This case has been discussed until there is nothing new to say. I do not believe that Oppenheimer ever intentionally damaged the security of the United States. Rumors come to us that other people will be summoned for clearance proceedings. A book has been

published attacking large numbers of scientists who have worked on the hydrogen bomb. Gordon Dean has denounced the book as completely unjust, and indeed as false. If this continues how do we recruit new scientists and engineers, not only for military work but for any kind of scientific and engineering work?

Let us look at this problem in outline at least. How about primary and secondary schools from the standpoint of production of technical people? Most of us in this room have expressed our dissatisfaction many times in this connection, in private at least. Fundamentally, how can we expect good schools with inadequate school plants and inadequate salaries for teachers? We treat teachers as though they were inferior human beings instead of as among the most important of professions. This has gone on for many years until today there is a lack of teachers of any qualifications. It is no longer a matter of securing men and women of ability, training and personality. It is a matter of getting anyone at all to do the job. The science teacher is usually the athletic coach. It is time we think of this problem.

Do we attract a substantial fraction of the people who have natural ability in the exact sciences into college? Or do they become mechanics of one kind or another? The wages of labor, due to effective union activities, do keep up with the depreciating value of the dollar, whereas scientific, engineering and professional salaries do not. And once attracted to college, do the students secure an adequate scientific training? Mostly industrial and government laboratories pay better salaries, and it is difficult to find capable professors for our colleges at the present time. Some offers that I have seen during the past years are pathetic. We face in this country a near-crisis in training scientists and engineers.

Are these adequate incentives for young people to enter technical professions at the present time? I see many young people starting the long road to a competent scientific career, four years of college and three to four years for a doctoral degree, and then some time spent in acquiring experience after this. Surely, public hearings for prominent scientists are not encouragement in this direction. Such appellations as "egg head" applied to all intellectuals including scientists and engineers are no inducement either. I believe that science is still sufficiently glamorous to attract large numbers of young men, but I begin to wonder what I would have done in 1914 if conditions had been similar to what they are now.

A lack of scientific and engineering talent may go completely unnoticed for years simply because we cannot see something that does not exist. Men calling themselves scientists will continue to be graduated and em-

ployed, but are they the best that we could produce? We never know. If Planck had not proposed the quantum theory in 1899, when would it have been proposed? If Bohr had not given that first push to the theory of the atom, who would have done it? I am convinced that if we do not do a better job of training scientists and engineers, work which might be done in the United Statees may well be done in some other country — and that country might not be friendly to us.

Efforts to improve our educational system and the conditions under which the best minds of our country work are likely to require diligence and great perseverence. They will require hard work and it will not be nearly so exciting as turning a bull into a china shop. We as scientists are accustomed to persistent work, and might well devote our efforts to such problems instead of helplessly wringing our hands or aiding and abetting some of the disruptive activity of shortsighted people.

Summary

The maintenance of the security of the United States and the free democracies of the west is by all odds the most important problem facing the people of the United States at the present time. The problem of such security is a very complex one, involving the entire life of the country and its relation to other democratic countries. Military defense is an important part of maintaining security. Scientific discoveries and developments are important in military effectiveness, and it is important that such processes remain secret as much as possible without impairing the overall effectiveness. Perhaps this secrecy has an importance of one per cent of the total effort but hardly more. The general public should hardly know that the problems of secrecy and espionage exist. Much more important for general consideration are the means of improving our general education for scientific men, as well as scholars in other intellectual fields. It would be well for the people of this country to turn from the Roman circus antics of pillorying scientists and hunting Communists and subversives to the less spectacular job of improving education in this country.

Opened: A spacious new laboratory at Harrison, N. J., by Metasap Chemical Company, a subsidiary of Nopco Chemical Company. The laboratory activities are under the supervision of F. J. Licata, F.A.I.C., technical director of Metasap.

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Harold C. Urey - The Scientist

Prof. Willard F. Libby

Department of Chemistry, Institute for Nuclear Studies, University of Chicago, Chicago, Ill.

(Presented when the Honor Scroll of the Chicago AIC Chapter was given to Dr. Urey, Chicago, Ill., Oct. 8, 1954.)

HAROLD CLAYTON UREY began his study of science in the University of Montana, his principal interest being zoology though he carried a minor in chemistry. After graduation, he was employed for a year in chemical industry as research chemist at the Barrett Chemical Company in Baltimore. In 1919, he returned to the University of Montana as an instructor in chemistry, where he remained two years. He then went to the Department of Chemistry at the University of California, Berkeley, where he did graduate work and obtained the Ph.D. degree in thermodynamics, 1923, at the age of thirty. Since then he has published over one-hundred papers on thermodynamics, quantum mechanics, chemical kinetics, nuclear physics, isotopic chemistry, geochemistry, geophysics, and astrophysics.

The quality of the research Prof. Urey has published is extremely high. I note that all of his work moves along with the frontiers of science. In 1923, at the center of chemical thermodynamics at the University of California at Berkeley, he worked in chemical thermodynamics. After receiving the degree, he undertook the study of quantum mechanics and published papers in the golden period of that subject, 1924 through 1927. Among these papers was one with Dr. F. R. Bichowsky, which alone would have established these gentlement as first rate scientists. It was an independent discovery of the electron spin for which Uhlenbeck and Goudsmit have been honored, and justly so, for their brief publication preceded by a short interval that of Bichowsky and Urey.

In 1928, while preparing a scholarly publication on "Atoms, Molecules and Quanta" with Prof. A. E. Ruark, Prof. Urey began the study of chemical kinetics. This continued for two or three years until his interest in nuclear phenomena was excited. New efforts in the systematics of nuclear properties and in the isotopic characteristics of matter culminated in his brilliant discovery of the heavy hydrogen isotope deuterium, for which he was awarded the Nobel Prize in chemistry in 1934. His interest in isotopic chemistry and nuclear physics continued for nearly ten years. In particular, he developed methods of separation of the light isotopes which are in part the basis of

the great new industry which the Atomic Energy Commission manages. He was among the first to make tracer applications of the stable isotopes and to realize the importance of the stable tracers. The study of chemical isotopic equilibria is a brilliant application of the principles of statistical mechanics, learned in the 1920's, to the new problems of the late 1930's.

With this background, it was natural that when the problems of the Manhattan District arose, Prof. Urey should be involved, particularly in the essential step, the separation of the uranium isotopes. The Columbia University Division of War Research was called upon to sponsor the work. Prof. Urey had joined the faculty of the Johns Hopkins University after leaving Berkeley and traveling in Europe as a postdoctoral fellow. He remained at Baltimore until 1929, when he moved to Columbia University, where he stayed until 1945. He then transferred to the University of Chicago. He was director of the SAM Laboratories at Columbia, which was the principal research laboratory for the diffusion process for the separation of the uranium isotopes, and the success of this particular process is a testimony to Dr. Urey's acumen.

Following the long hard period of the war, he moved to the University of Chicago, and in characteristic fashion, making a complete change, moved once again to the frontiers of science, the application of the basic physical sciences of chemistry and physics to geology and astronomy. His contributions in this work are remarkable. The knowledge he has gained of these infinitely complicated natural systems is stupendous. His insight and curiosity are extraordinary. The work continues in the fine style of his past, and shows no sign of diminishing, in either quality or quantity.

I would not be surprised if Prof. Urey once more in his life should select a new subject, closer to the frontiers of science. Some inkling of this appeared about a year ago in a research he and one of his graduate students undertook, a study of the formation of the molecules essential to life, the amino acids. This brilliant work is some hint of an awakening interest.

As a scientist, Dr. Urey has several remarkable characteristics. He has a nose for good problems; he knows the general trends and currents in science; he has an amazing ability to concentrate, an amazing ability to assimilate new material, and an amazing knowledge of the classical fundamental information in both chemistry and physics. It is a real pleasure and honor to offer this testimonial of my admiration for my good friend Harold Urey.

Harold C. Urey - Politics and the Man

Dr. Malcolm Dole

Professor of Physical Chemistry, Northwestern University, Evanston, Illinois

(Speech delivered when Dr. Urey received the Honor Scroll of the Chicago Chapter of The American Institute of Chemists.)

In 1951, when Northwestern University was celebrating its 100th anniversary, I was seated at a function next to President Emeritus Walter Dill Scott. I asked him if he had personally known John Evans, one of the founders of the University. He replied that he had and that John Evans was a truly great man, one of the giants of the 19th Century, the greatest man he had ever known. Then he sighed and remarked, "They don't make men like John Evans any more!" As scientists I don't believe that any of us would believe that; favorable mutations of the genes occur too slowly and too infrequently to change the human race noticeably in one or two generations. Men like John Evans do exist and are still being born. These empire builders, these creators of civilization in the wilderness have gone into the realm of science whose frontiers of the unknown continue to beckon. I submit that Professor Urey is one of the great pioneers of our day.

I remember vividly the first time I saw Prof. Urey. It was in New York during the academic year 1929-30, a few months after he had been brought to Columbia as an associate professor from Johns Hopkins. Urey gave a lecture on his photochemical and kinetic work. I was enormously impressed with his dynamic energy and drive, with his intense concentration on his research, with his outstanding ability as a lecturer and speaker. A few weeks later, my old teacher at Harvard, Grinnell Jones, asked what I thought of a certain professor as a replacement for T. W. Richards who had died in 1928. I replied that Urey was the coming man, the man Harvard should select. Unfortunately, they did not know Urey well enough then to consider my suggestion seriously.

Two years later, Urey made the great discovery that was to win for him the Willard Gibbs Medal and the Nobel Prize in chemistry, and that would make him a great public figure. Government and the public turned time and again to him for advice such that a scientist would give and for information as to the opinions, feelings, and attitudes of the scientific world. Urey feels as deeply and intensely about public questions of democracy, freedom and peace as he does about his own scientific researches. Furthermore, he does something about it. In 1938, four years after receiving the Nobel Prize, he

accepted the chairmanship of the "Columbia University Federation for Democracy and Intellectual Freedom" and appealed to 500 American college and university presidents to give free tuition and scholarships to refugees from Hitler Germany, Franco Spain and Mussolini Italy. In July, 1940, Urey became the head of a sub-committee of 820 scientists of William Allen White's "Committee to Defend America by Aiding the Allies."

Although emphatically believing in the cause of the Allies, Urey in 1940 joined with a number of Columbia professors in an open letter to his president, Nicholas Murray Butler, demanding that Butler clarify his stand on academic freedom and tenure after Butler had made a speech suggesting that Columbia faculty members whose convictions brought them into conflict with his ideas regarding the sacred cause of the Allies resign.

Before this Urey had supported the cause of the Spanish Loyalists in their fight for "Democracy and Freedom against the Fascist insurgents under Franco." Because of this, the Fellow-travelers and Communists of New York thought that they had Urey completely under their subtle control. Consequently when President Franklin D. Roosevelt announced the transfer of the destroyers to Great Britain when that nation was desperately in need of them, the Communists of New York suggested to Urey that he denounce this deal. This was in the days of an "unnatural alliance" between Hitler and Stalin. Much to their surprise, Urey replied vigorously that he was all in favor of the destroyer deal, that indeed, President Roosevelt should do even more. When I tell you that in 1951, when speaking before the American Technion Society in New York, Urey advocated warning Russia that we would not hesitate to use the atomic bomb against her if she should attack in Europe, I should lay at rest even the slightest suspicion that Urey is a Communist wolf in sheep's clothing or even a fellow-traveler. Actually in economic matters, he is a conservative fellow.

During the war Urey threw himself with such energy and intensity into the atom bomb project that he had no physical resources left over for political or sociological activities. He was carrying the great weight of the responsibility of a project involving nearly half a billion dollars at a time when the success of the project was most uncertain. Professor Libby was a source of great strength to Urey, particularly in regard to the decisions over the barrier, the crucial element of the K-25 process, Urey's process for separating the isotopes of uranium.

It was after the war that Urey, excited and worried over the ultimate fate of the atomic energy project and its relation to the future peace and

security of the world, really threw himself into the political arena. On Oct. 18, 1945, he went to Washington to protest against the May-Johnson bill, which gave control of the atomic energy project to the military. Three days later, at luncheon of the American Scandinavaian Foundation, he predicted that Russia would have the atomic bomb within five years (his prediction was correct, it took four years). At that time he called for a World Government to control the production of atomic bombs. On Oct. 25th, he joined with Smyth and Compton calling for a National Science Foundation. On Nov. 8th, with Szilard and others, he announced the formation of the Federation of Atomic Scientists, and on Dec. 4th, he spoke at a huge mass meeting before 19,000 people in Madison Square Garden, N. Y., and again urged World Control of Atomic Energy. This meeting, which included speeches by Henry Wallace, Sen. Tobey of New Hampshire, Danny Kaye, Jo Davidson, and Julian Huxley, who flew from England expressly for this meeting, was organized by a group known as the Independent Citizens Committee of the Arts, Sciences and Professions.

In Chicago, to which Urey moved in 1945 as a distinguished service professor, he with former vice president, Reuben Gustavson, of the University of Chicago, sent out a call to the scientists of this area to set up a Chicago Section of the Science Division of the Independent Citizens Committee and to attend a rally for this purpose at the University of Chicago. I remember vividly this meeting; the enthusiasm of the audience that packed the hall, the speeches of Seaborg, Allison, and others. A large number of scientists joined up; an executive committee was formed with Prof. Hogness of the University of Chicago as chairman, and a huge mass meeting at Orchestra Hall was planned, organized and successfully carried out. Urey spoke at this rally for the civilian and world control of atomic energy and over $3000 net was raised by the sale of tickets and contributions. This money was used in part to send Hogness to Washington where he conferred with Sen. Vandenberg and others over the Vandenberg amendment to the McMahon bill for the civilian control of Atomic energy, and succeeded in putting this amendment into a form acceptable to both military and civilian leaders. Thus through the leadership and inspiration of Urey, this legislative problem was solved and Urey can be largely credited for the successful outcome of the fight to establish civilian control of the atomic energy project.

All through the post war period, Urey strongly advocated some sort of world government and international control of atomic bombs. When the Baruch plan for the latter was turned down by the United Nations because

of opposition from the Soviet Union and Poland, Urey turned to the Atlantic Union Committee of which he was made a director. He believed that a strong Federal Union of Democracies might immobilize the Soviet dictatorship and eventually cause its downfall. On Jan. 27, 1950, he recommended that work proceed on the development of the H-bomb. But he has always been a strong supporter of peacetime applications of atomic energy. On Nov. 20, 1951, when speaking at a University of Chicago Round Table radio broadcast, he frankly criticized Conant, Du Bridge and other members of the scientific advisory committee of the Atomic Energy Commission for not pushing more energetically and enthusiastically the development of industrial power plants using the energy of the fission reaction.

Urey has always been an exceedingly frank and honest individual; he has had the courage, as Priestly did in England many years ago, to espouse unpopular causes. He supported the Rosenbergs in their plea to reduce the severity of their conviction for spying. As Urey does in his scientific work, so in this case he energetically made a thorough study of the Rosenberg trial, reading the entire transcript of the testimony, conferring with Law School professors to obtain their legal opinion and literally saturating himself with the case. He found the testimony of the Rosenbergs, to quote his words, "more believable" than that of the Greenglasses whose testimony he thought may have been colored to save their own skins. Quoting from an open letter which he wrote on Dec. 16, 1952, Urey said, "Accepting the verdict as correct, I am amazed and completely outraged by the unequal punishment which has been given. I believe the Rosenbergs are or have been Communists or very sympathetic to Communist ideas. I regard such people as unreliable generally, but I do not believe in punishing people unless they commit crimes."

Urey has been emphatic in his opposition to the visa curbs of the McCarran act; he joined with eight other eminent scientists in a letter to Nobel Prize Winner Joliot-Curie asking him to withdraw his name from the Prague statement supporting the allegation of the use of germ warfare in Korea by us; in 1948 he was chairman of a dinner committee to honor that great scientist, Dr. Edward U. Condon, who was under attack by the Un-American Activities Committee of the House; everywhere we see him coming to the support of those he considers unjustly accused, to the support of academic freedom, to the support of democracies and most important of all to the support of efforts to secure world peace. Much he has accomplished and much more will he accomplish in the future as his voice rings out clearly and forcibly for freedom, for democracy, for justice and for peace.

Harold C. Urey (left) of the Institute for Nuclear Studies, University of Chicago, accepts 1954 Honor Scroll Award from A.I.C.'s Chicago Chapter chairman L. A. Hall of Griffith Laboratories.

Presentation of the Honor Scroll to Dr. Urey

Dr. Lloyd A. Hall, F.A.I.C.

Chairman, Chicago Chapter, The American Institute of Chemists

AN EVER increasing concern of scientists regarding social problems and social progress has been evident for some years, especially since scientists attained manhood in the public mind of this century in the development of the atomic bomb, and people have become uneasy with forebodings that civilization might disintegrate if another war should come.

Many of us believe our nation can survive, progress, surmount international difficulties — can ascend to the highest peak of greatness — if we properly use scientific methods in our attack and attitude on the perplexing problems of living and working together harmoniously and equitably in our present complex society. Our fitness to survive has been demostrated. Our fitness for continued survival as a nation depends on many factors based primarily on a vigorous and real demonstration of the vitality of our own beliefs in democracy and freedom.

History reminds us that in ancient Greece the wise man was both philosopher and scientist. He took

the whole universe for his subject matter and his objective was to know the origin, the nature, and the destiny of man and of all things.

We honor a man who is not only one of the giants of the present day scientific world, but a philosopher who is one of the foremost proponents of the development of nuclear fission for peaceful and industrial purposes. He is a scientist who would use the scientific method for the further development of nuclear fission for peaceful and industrial purposes. He is a scientist who would use the scientific method for the further development of a lasting, peaceful world. He is the modern epitome of that wise man of Ancient Greece. Many of the highest scientific honors have been awarded him, but we are honoring him as an outstanding chemist who has improved and advanced the economic status of chemists by his contributions to the public — his public relations, relating to the importance of the chemist and his developments in our social system.

When a large representative business concern invites a distinguished scientist to write them of his hopes and dreams of a better world for everyone, it is, indeed, unusual. When his answer is reproduced in the public press, it seems to indicate many citizens of this country are depending on scientists for help and action in the solution of our domestic and world problems.

On Dec. 21, 1948, a full page sponsored by Marshall Field & Co. appeared in *The Chicago Tribune*. The only thing on this page was a letter from Dr. Harold C. Urey which read:

> "Dear Santa Claus: I was delighted when I was told I might write a letter to you again after these many years, and in thinking about it I found that my desires had greatly increased during the years. There were so many things to ask for that it was difficult to choose, so I have resolved to ask for just one thing.
>
> "Give us this Christmas, and for the years to come, a well-organized world community, one that will give us justice, individual liberty, and law and order in the world where in the past and at the present there is so much anarchy between the nations of the world.
>
> "You, of course, know even better than I why I ask for this, as you know the desires and wishes of all of us. But I think that such a world community would do much to prevent the marching of our young men in future wars, where at the best they waste good years of their lives in squalor and dirt, and at the worst lose their lives. Perhaps also it will prevent the rain of modern weapons of destruction from the skies upon us all. And I desire this world community because as a scientist I wish that the children of my mind, and the very great ones of my colleagues, be used to promote the happiness and well-being of people, and to bring beauty and understanding to their lives, and not for the purposes of death and destruction."

Dr. Harold Clayton Urey, distinguished man of science, you have been honored many times for your outstanding scientific achievements. Our award to you this evening is for conspicuous service of another kind, more indirect perhaps, but we believe of

great significance. We are proud to give public expression for your devotion to the improvement of the status of chemists and the chemical profession, for your service to the public in providing a better appreciation of the chemist to world progress, and simply because you are the kind of good citizen who merits public esteem.

As representative of the Chicago AIC Chapter, it is a pleasure and a great privilege to add the name of Dr. Harold C. Urey to the list of distinguished past recipients and to present to you this testimonial award.

The citation reads:

The American Institute of Chemists
Chicago Chapter

Be it known that Harold C. Urey has been granted the 1954 testimonial award and was the honored guest at a dinner given by the Chapter in recognition for his active devotion to the thesis that scientists have an obligation to society as citizens equal to their obligation to scientists; for his unceasing efforts to emphasize the use of fissionable materials and nuclear devices for peaceful purposes; for his outspoken advances of academic and scientific freedom, and for his distinguished scientific achievements.

About The AIC

Dr. Lloyd A. Hall, F.A.I.C.

Chairman, Chicago Chapter, The American Institute of Chemists

(Introductory remarks when Dr. Urey was awarded the Honor Scroll of the Chicago Chapter)

In 1923, thirty-one years ago, a group of chemists with an unusual perceptive founded The American Institute of Chemists to advance the professional position and to improve the economic status of chemists in the United States. To do this it was necessary to educate the individual chemist to appreciate his position as a member of a highly specialized basic profession as well as to inform the public about the importance of the chemist in our social system. In the intervening years much has been accomplished, but there is and will always be a great more to be done in our rapidly changing society and profession.

At present, the Institute consists of twelve chapters under the control of a strong and progressive national organization. Incidentally, the Chicago Chapter will be host for the Annual meeting of The American Institute of Chemists in May, 1955.

The more important objectives of the Institute may be outlined as these:

1. To enforce a code of conduct which justifies confidence in the integrity of the chemist.

2. To maintain a high standard of proficiency.

3. To secure an adequate basic training for the profession.

4. To enhance the prestige and distinction of the profession so as to extend its influence and usefulness.

5. To seek to improve the economic status of the profession by cooperating with employers and the public to secure a satisfactory appreciation and evaluation of the chemist.

6. To cooperate with all agencies serving chemistry to make the chemical profession a powerful factor in the advancement of intellectual and material progress in the United States.

THE AMERICAN INSTITUTE OF CHEMISTS has no conflict with other scientific societies. In fact, many in its membership are affiliated with other scientific organizations and presently occupy simultaneously official positions in them. Not the least of the objectives of THE AMERICAN INSTITUTE OF CHEMISTS is the appropriate recognition of distinguished service to the profession. This is good reason for our assemblage to present the honor award of the Chicago Chapter.

Promoted: Dr. George L. Royer, F.A.I.C., to administrative assistant to the general manager of the Research Division of American Cyanamid Co. He will coordinate policies on budgets, personnel, and publications at the division's laboratories in Stamford, Conn., Pearl River, N. Y., and Bound Brook, N. J.

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Retired: Lawrence H. Flett, F.A.I.C., former AIC president, who has been with National Aniline Division of Allied Chemical & Dye Corporation for thirty-five years. For the past twelve years, he has been director of the New Products Division and prior to that he served in various capacities in research and operations. He holds about seventy-five patents in the field of chemistry. The great development of synthetic detergents is largely based on work which he pioneered. He is the author of many publications and co-author of several books, the most recent of which is *Maleic Anhydride Derivatives*. He will continue to serve National Aniline as a consultant.

The man with the spade: Chester A. Amick, F.A.I.C.; behind him, Dr. E. De Alton Patridge, president of Montclair State Teachers College; to the right of Mr. Amick, front row: Dr. Herbert MacKinney, F.A.I.C.; to the right of him, the man in the dark suit, in profile, front row: Dr. R. D. Reed, F.A.I.C.; the rest are faculty members of the college.

How the New Jersey AIC Chapter Aided Montclair State Teachers College

RECOGNITION of the aid given by the New Jersey AIC Chapter to Montclair State Teachers College was commemorated by the College when it invited representatives of the Chapter to participate in the groundbreaking ceremonies for the new science classroom building at Montclair, Oct. 13th.

In a letter to Chester A. Amick of American Cyanamid Co., Bound Brook, N. J., Mrs. Robert E. Corso, director of public relations of the Montclair State Teachers College, enclosed the above picture of the groundbreaking ceremonies, and stated:

> "Because you took such an active part in assisting Montclair State Teachers College — particularly the Science Department — to obtain the classroom building now under construction, I thought you would be interested in the (above picture) of the groundbreaking . . . Thank you

sincerely for your generous participation."

The new structure, to cost $653,833, will provide for the teaching of science, mathematics, home economics, and fine and industrial arts. It is planned to be completed in the late summer or early autumn of 1955.

The New Jersey Chapter surveyed science teacher education in the State of New Jersey in 1949. A four-man committee was appointed to study the facilities at Montclair State College. The Committee members were Dr. Herbert W. Mackinney of the Bakelite Corporation, Dr. Paul Allen of Stevens Institute of Technology, Dr. A. McLean of Bell Telephone Laboratories, and Dr. A. G. Hill of American Cyanamid Company. They reported that "The Committee was shocked by the inadequacy in the physical facilities for instructing high school science teachers in a state which is the leading producer of chemical products in the U.S. Laboratories are overcrowded. Storage space is inadequate and improper. Professors are hampered in the work by lack of office space. Temporary buildings, old and antiquated laboratory furniture, shared locker space, jammed classrooms, make the task of learning exceedingly difficult."

A Committee of the New Jersey Chapter, headed by Chester A. Amick, then helped with plans for proposed new science laboratories and classrooms for the college.

In Nov. 1951, the New Jersey voters were urged by the State Board of Education, Governor Driscoll, and the press in general, to approve a $15,000,000 bond issue to be used for buildings and equipment for the state teachers colleges. The bond issue was approved, and a $4,700,000 state allotment was made to Montclair Teachers College for the construction of five new buildings, including the science classroom building now being built.

Honored: Dr. John R. Bowman of Mellon Institute, councilor of THE AMERICAN INSTITUTE OF CHEMISTS, and chairman-elect of the Pittsburgh Section of the American Chemical Society, who received the Professional Progress Award of the American Institute of Chemical Engineers, in New York in December. His acceptance address was entitled, "Sidelights on Computers."

Chosen: As president-elect of the American Chemical Society, Dr. John Christian Warner, Hon. AIC. He will head the society in 1956.

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Communications

Dr. Byers Appreciated

To the Editor:

It pleased me to learn through THE CHEMIST that THE AMERICAN INSTITUTE OF CHEMISTS has awarded Dr. Horace G. Byers with Honorary Membership and citation.

Dr. Byers at Cooper Union was my first teacher of chemistry and his friendship toward me lasted even after my Cooper Union days. I visited Dr. Byers on a number of occasions while he was with the Department of Agriculture in Washington. He went out of his way to be helpful not only as a professor, but as a fellow chemist.

I think that THE AMERICAN INSTITUTE OF CHEMISTS are honoring themselves in conferring the Honorary Membership to Dr. Byers.

—NICHOLAS M. MOLNAR, F.A.I.C.
Director, Fine Organics, Inc.
New York, N. Y.

One-Year Term for President Approved

To Dr. Donald B. Keyes:

Although I have no aspirations to become president of THE AMERICAN INSTITUTE OF CHEMISTS, I think that your idea of having the president serve during a one-year term instead of a two-year term is excellent. When a president-elect is selected by the membership he serves concurrently with the president in a semi-executive capacity and so by the time he has completed his year as president he has really served two years, one as an apprentice and the other as the active presiding officer. I hope that the idea will meet with the approval of the membership.

—DR. ALEXANDER SILVERMAN, *Hon. A.I.C.*
Professor of Chemistry, Emeritus
University of Pittsburgh

The Beloit College Presidential Installation

To the Secretary:

Received your telegram asking me to represent THE AMERICAN INSTITUTE OF CHEMISTS at Beloit College, Beloit, Wis., at the installation ceremony of Miller Upton as president of Beloit Co'lege, Oct. 29th.

I arrived at Beloit about 10:30 and presented my credentials. We were served a luncheon at Emerson Hall and then about 1:45 the delegates from 223 different colleges and universities, and 27 scientific and other organizations met in the basement of College Chapel for robing in academic attire. At 2:30 the procession, consisting of the above delegates, the faculty of College, the Trustees of College, and a few others, marched to their places in the main auditorium of the chapel where the inauguration took place.

It was an impressive ceremony and from the acceptance speech I believe Beloit College has acquired a dynamic leader with a sympathetic and understanding outlook for guiding the young minds which elect to attend that College . . . .

—DR. M. STARR NICHOLS, *F.A.I.C.*
Assistant Director, The State
Laboratory of Hygiene, Madison, Wis.

Job Management Articles Liked

To the Editor:

THE CHEMIST gets better and better. I avidly devour all the material printed in it on jobs and job management . . .

—ORA BLANCHE BURRIGHT, F.A.I.C.
Denton, Texas

A Bargaining Consultant

To Dr. Walter J. Murphy, Editor, *Chemical & Engineering News*: (Copy, with permission to publish, to THE CHEMIST)

Your *Chemical & Engineering News* has always proved to be a mental stimulant to me, but the Dec. 20th issue was exceptionally stimulating. Your correspondents advise me that had I utilized the services of a "duly elected union representative" to help me argue with my boss, my advancement would have been faster and more certain.

Furthermore, one correspondent implies that such progress as I have made in the last 38 years has been due, at least in

part, to the grim crusade union leaders have made during this period to raise the living standards of non-professional people—a crusade to which I should have contributed.

Perhaps you, Mr. Editor, are also stimulated and perhaps you feel the urge to write an editorial on the subject. If so, I have a few happy and constructive suggestions.

You might point out that a scientist or engineer could possibly use *not* a "duly elected union representative" but one carefully selected by him and one who would work exclusively for him, as he selects and uses the services of a lawyer—in brief, a "bargaining consultant."

Think of what this would mean to the Professor who is up against a "difficult" department head, dean, or president; to the Research Director when he argues his budget with top-management; or to a President when he argues company policy with his Board.

You might point out that any union representative who can produce results in this field would be very well paid for his services. Furthermore this work would be not only lucrative but extremely interesting. Don't you agree?

—Dr. Donald B. Keyes, F.A.I.C.
New York, N. Y.

The Chemist Presented

To the Secretary:

I derive much good from The Chemist and have a complete file in my library (recently presented to Evansville College Library) since my election to AIC membership in 1936 . . . I shall continue to present each volume to the college.

—Dr. Alvin Strickler
Frankfort, Michigan

Needs The Chemist

To the Editor:

I am enclosing a money order for $6.00 in payment of two years' subscription to The Chemist. I found that I needed this publication despite the (other) publications that I get.

—Elmer A. Finch
Amityville, N. Y.

Predictions

The Outlook for 1955

The outlook is very good. 1955 should be an even better year than 1954 — a new year of greater opportunities to increase prosperity and to advance peace . . . I believe we shall have a moderate upswing in business activity.

—Sinclair Weeks
Secretary of Commerce

Atomic Power

We stand today at the gateway of what promises to be a great scientific revolution which will probably work a far greater change in our mode of living than the so-called industrial revolution has wrought in the past century or so . . . It is conceivable that our automobiles in the not-too-distant future may be powered by a simple atomic battery and will require no other fuel. It is possible that a similar source of power may be built into each home and apartment house so that it will no longer be necessary to install and maintain elaborate distribution systems to carry electricity.

—Benjamin F. Fairless

American industry in 1955 will increase substantially its investment in research, development, and actual construction of atomic energy projects.

—Walker L. Cisler
Atomic Industrial Forum, Inc.

Solar Energy

By the end of the century solar energy will be the dominant factor in the production of industrial power. The practical utilization of this inexhaustible source of energy, together with the resulting great changes in the production of food, will have enormous effects on the economy, and hence on the political relations of nations.

—Dr. James B. Conant, Hon. AIC

There is an immense fund of possible mechanical power coming to us from (the sun) which might be economically utilized . . . We present Ericsson's actually working solar engine, which there is every reason to believe is more efficient than

Mouchot's, and probably capable of being used with economical advantage in pumping water in desert regions of our own country . . . Future ages may see the seat of empire transferred to regions of the earth now barren and desolated under intense solar heat — countries which, for that very cause, will not improbably become the seat of mechanical and thence of political power.

—S. P. Langley
(Nov. 1884)

Engineering Manpower

The number of engineering graduates has declined steadily in recent years, dropping from 41,000 in 1951 to 20,000 in 1954. The total for 1955 will be somewhat larger, an estimated 24,000, but will be far below the approximately 30,000 required by industry annually.

—Dr. John T. Rettaliata
Illinois Institute of Techonology

Food

Wary as I am of forecasts, I do predict that within the next fifty years an appreciable part of the world's food will be produced in chemical reactors from air, oil, and water.

—Robert E. Wilson
Standard Oil Company (Indiana)

Business

For fifteen years business has either been artificially stimulated by the demands of war or, conversely, artificially depressed by its aftermath. Today neither is the case, and if nothing happens to upset the applecart again we are going to have a chance to see what industry can do when it is not under the influence of stimulants or sedatives.

—Dr. Leland I. Doan
Dow Chemical Company

Automation

By the end of the next decade this country will be consuming products at double the present rate, with an "available work force" only eleven per cent greater than today's. This will come from industry's application of one or both of two basic types of automation.

—John J. Rudolf
Minneapolis-Honeywell Regulator Co.

The AIC

The American Institute of Chemists will grow five-fold in the next five years, as its message about professionalism gets across to the dedicated chemists of this country.

—Dr. Ray P. Dinsmore, *Hon. A.I.C.*

Honored: By the Six Nations Indians at the 160th Anniversary Celebration of the Jay Treaty in the Niagara Falls area of New York, M. R. Bhagwat, F.A.I.C., of the Research and Development Division of Hooker Electrochemical Company. Those "adopted" by the Indians participated in special ceremonies. The gathering was attended by several thousand Indians from Canada and the United States, who also commemorated the 27th Annual Border-crossing.

Promoted: Raymond G. Newberg, F.A.I.C., to section head in the Chemicals Research Division of Standard Oil Development Co., Linden, N. J., where he will assist in chemicals product development.

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AIC Activities

C. P. Neidig, F.A.I.C.

New York Chapter

Chairman, John Kotrady
Vice-Chairman, Jack Dollinger
Secretary-Treasurer, Richard L. Moore, Foster D. Snell, Inc., 29 West 15th St., New York 11, N. Y.
Representative to National Council: Karl M. Herstein

The Chemist in the Medical Field

Dr. Randolph T. Major, F.A.I.C., scientific vice president of Merck & Co., Inc., will discuss "The Chemist in the Pharmaceutical and Medical Fields" at the February 24, 1954, dinner meeting of the New York Chapter, to be held at 6 p.m. in the New York Times Dining Room, 229 W. 43rd St., New York, N. Y.

The discussion will include a consideration of chemists' opportunities in the pharmaceutical and medical fields, in the laboratories of colleges, universities, medical schools, research institutes, hospitals and industries. Consideration will be given to the need for chemically trained people in sales and patent work, marketing and administration. Dr. Major will discuss the training attitude and approach to work necessary for success as a professional chemist in this field. He will recommend his own philosophy of work, developed through years of experience in

his field. He has best summarized this philosophy by the statement: "While the salaries paid pharmaceutical and medicinal chemists are comparable with those of other chemists, the real rewards are the satisfactions coming to people in this field in being able to contribute to the health and well-being of mankind."

John Kotrady of the Texas Company, chairman of the chapter, will preside and conduct a question and answer period following Dr. Major's talk. Reservations for the dinner ($2.75) should be made to Shepherd Stigman, Foster D. Snell, Inc., 29 W. 15th St., New York 11, N. Y. (WA 4-8800).

Please Note

The correct title and position of Isidore Schnopper, who was listed on page 474 of the December 1954 issue of THE CHEMIST, are: Chief, Methods Division, U. S. Customs Laboratory, 201 Varick St., New York, N. Y.

New Jersey Chapter

Chairman, Dr. H. W. Mackinney
Chairman-elect, Dr. Cecil L. Brown
Treasurer, Dr. W. A. Raimond
Secretary, Dr. William R. Sullivan
Representative to National Council:
Dr. James B. Allison

Bell Telephone Laboratories Trip

A field trip to the Bell Telephone Laboratories, Murray Hill, N. J., to see recent Bell Telephone Scientific Developments is scheduled for Tuesday, March 29, 1955, for the New Jersey Chapter. Those attending will meet at 1:45 p.m. in the Murray Hill Laboratory Auditorium. Following the tour, which ends at 4:45 p.m., there will be a dinner and AIC meeting to talk about professional affairs and to transact the annual business of the Chapter. Dinner and tour reservations should be made with Dr. W. R. Sullivan, Hoffmann-LaRoche, Inc., Nutley, N. J. (Nutley 2-5000), by March 22nd. If, however, members bring guests who are non-citizens, these will have to sign up for the trip at least two weeks in advance so that they can be properly cleared, as classified work is being carried out in the Laboratories.

Western Chapter

Chairman, Dr. Kenneth W. Newman
Chairman-elect, Thomas J. Rollins
Vice Chairman, Gerald I. Gruber
Treasurer, Dr. Frederick G. Sawyer
Co-Secretaries: Alfred J. Webber, Braun Corp., 2260 E. 15th St., Los Angeles 21, Calif.
Thomas J. Kehoe, 4301 Yosemite Way, Los Angeles 65, Calif.
Representative to National Council:
Dr. Roger W. Truesdail

Criminalistics

"Lee Jones of the Crime Lab" is a familiar and interesting note that has been heard by all viewers of "Dragnet". The Western Chapter was privileged to hear a discussion on criminalistics by the real Lee Jones at the December 14th meeting.

Lt. Leland V. Jones of the Los Angeles Police Department discussed the essential importance of physical evidence in modern crime detection and the conviction of criminals.

The operation of a modern large Crime Laboratory in a city such as Los Angeles makes great use of forensic chemistry in providing evidence for use by all branches

of the Police Department. In practice, forensic chemistry includes practically all of the basic sciences. Many of the analytical and detection methods involve physical tests as well as chemical.

Illustrating the talk were a large selection of slides showing how the scientific approach to physical evidence prevents crime from being a paying proposition in Los Angeles.

Washington Chapter

President, Paul E. Reichardt
Vice President, Dr. Frank Gonet
Treasurer, Albert F. Parks
Secretary, T. Allan Davis, 1016 Urell Place, N.E., Washington 17, D.C.
Representative to National Council: Paul E. Reichardt

Honor Award Presentation

Dr. Eduard Farber, F.A.I.C., chief chemist, Timber Engineering Company, was presented with the 1954 Honor Award of the Chapter on December 7, 1954. This award will be featured in an early issue of THE CHEMIST.

Chicago Chapter

Chairman, Dr. Lloyd A. Hall
Chairman-elect, Clifford A. Hampel
Vice Chairman, Dr. Harold M. Coleman
Treasurer, Albert S. Henick
Secretary, John Krc, Jr., Armour Research Foundation, 10 W. 35th St., Chicago 16, Ill.
Council Representative, Dr. Gustav Egloff

Two for the Price of One

Eighty hours research for forty hours pay? What company would refuse that bargain? But it falls squarely on a company's shoulders to help its researchers attain that level of output.

On the other hand, what researcher can risk passing up the chance to double his value to his company, hence insure his own job security.

Dr. Johan Bjorksten, director of research of Bjorksten Research Laboratories (Madison, Wisc.) will shed light on both aspects of the problems. He will speak on "Effective Use of Chemists" at the February 22nd meeting of the Chicago AIC Chapter.

The company must see that its skilled professional men have enough assistants to handle less skilled work. It should also explore the use of time study to simplify the routine jobs found in even the most complicated research projects. Statistical planning of research can be a tool for getting data economically with a minimum number of experiments. Apparatus and equipment can be redesigned to a higher degree of automatization.

The meeting will be held Feb. 22nd, at the Chicago Engineers Club.

Annual Meeting Committees

The following committee chairmen are making plans for the 1955 AIC Annual Meeting, to be held at the LaSalle Hotel, Chicago, Ill.

Honorary Chairman, Dr. Gustav Egloff, Universal Oil Products Co., 30 Algonquin Road, Des Plaines, Illinois

General Chairman, Dr. Roy C. Newton, Swift & Co., Union Stock Yards, Chicago 9, Ill.

Chairman of Program Committee, Dr. Ray P. Dinsmore, The Goodyear Tire and Rubber Co., 1144 E. Market St., Akron 16, Ohio

Co-chairman of Program Committee, Dr. Bernard S. Friedman, Sinclair Refining Co., Sinclair Res. Labs, Inc., 400 E. Sibley, Harvey, Ill.

Chairman of Arrangements, Edward L. Gordy, Standard Oil Co., 910 S. Michigan Ave., Chicago 80, Ill.

Treasurer, Dr. Herman S. Bloch, Universal Oil Products Co., (Drawer C.), Riverside, Illinois

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Chairman of Registration, Dr. Waldersee B. Hendrey, Hendrey Chemical Co., 1535 N. Dayton St., Chicago 22, Ill.

Chairman of Publicity, Frank C. Byrnes, McGraw-Hill Publishing Co., 520 N. Michigan Ave., Chicago 11, Ill.

Chairman of Special Events, Herbert F. Schwarz, Sherwin-Williams Co., 116th St. & Champlain Ave., Chicago 28, Ill.

Honorary Chairman, Ladies Committee, Mrs. Lloyd A. Hall

Co-chairmen, Ladies Committee, Mrs. Bernard S. Friedman
Mrs. Herman S. Bloch

Ex Officio Member of Committees, Dr. Lloyd A. Hall, Chairman, Chicago Chapter. Griffith Labs., Inc. 1415 W. 37th St., Chicago 9, Ill.

Pennsylvania Chapter

Chairman, Dr. Walter W. Thomas
Vice Chairman, Dr. Robert Kunin
Secretary-Treasurer, John H. Staub, Barrett Div., Allied Chemical & Dye Corp., Margaret & Bermuda Sts., Philadelphia, Pa.
Representative to National Council, Marcus Sittenfield

Honor Scroll Award

The Honor Scroll Award meeting was held December 2, 1954, and the recipient was Dr. Arthur Osol, F.A.I.C., of the Philadelphia College of Pharmacy & Science. This award will be featured in an early issue of THE CHEMIST.

February Meeting

On February 3rd, Dr. John Bockris of the University of Pennsylvania will speak on the "Chemical Profession in England." This meeting should be most interesting, since Dr. Bockris is a noted scientist and distinguished speaker. He was born in Johannesburg, South Africa, Jan. 5, 1923, and educated in Brighton and London, England. He obtained the B.Sc. degree in chemistry in 1943 and the Ph.D. in 1945, joining the faculty of the Imperial College of Science and Technology of the University of London in that year. In 1952 he was awarded the degree of D.Sc. by the University of London for "authoritative contributions to the field of electrochemistry." From September 1953 to July 1954 he has held a visiting professorship in chemistry at the University of Pennsylvania and since September 1954 holds a full professorship in the chemistry department of this University.

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April Meeting

The Chapter will meet April 7th, when Dr. Mary Willard of the Department of Chemistry of the Pennsylvania State University will speak on "Women in the Chemical Profession." This is a very timely topic. Dr. Willard has indicated that one out of every ten chemists in the U. S. in 1954 was a woman, in contrast to one out of forty in 1940, and one out of five-hundred in 1930. There can be no doubt that women are a force to be reckoned with in our profession and Dr. Willard's talk will be most interesting.

May Meeting

The final meeting of the 1954-1955 program will be held on May 5th. It will be the student award meeting. We hope to have a speaker from the City of Philadelphia at this meeting to discuss, "The Responsibility of the Chemical Profession to the Community."

Will You Come

Jan. 7, 1955. Chicago Chapter. Dinner meeting. Chicago Engineers Club, 314 S. Federal St., Chicago, Ill. 6 p.m. Speaker, Dr. Emil Ott, F.A.I.C., "Stimulating Creativity."

Jan. 11, 1955. Washington Chapter. Luncheon 12:15 p.m. O'Donnell's Restau-

rant, 1221 E St., N.W., Washington, D.C. Speaker: Dr. John R. Heller, director, The National Cancer Institute.

Jan. 20, 1955. New York Chapter. East Ballroom, Hotel Commodore, 42nd St. & Lexington Ave., New York 17, N. Y. 6:00-7:00 p.m. Reception, Grand Foyer of East Ballroom, courtesy American Cyanamid Company. 7:00-8:00 p.m. Dinner. Informal. Honorary Chairman, Dr. Wallace P. Cohoe. Toastmaster, John Kotrady. Introduction, Dr. Robert C. Swain. Presentation of Honorary AIC Membership to Dr. Milton C. Whitaker, retired vice-president, American Cyanamid Co., Dr. Donald B. Keyes. Honor Recipient's Address, Dr. Milton C. Whitaker.

Feb. 3, 1955. Pennsylvania Chapter. Dinner. 6:30 p.m. ($2.75). Engineers Club, 1317 Spruce St., Philadelphia, Pa. Speaker, Dr. John Bockris of the University of Pennsylvania, "The Chemical Profession in England." Reservations: John Bohrer, International Resistance Co., 401 N. Broad St., Philadelphia 8, Pa. (WA 2-2166)

Feb. 8, 1955. National AIC Council and Board of Directors. The Chemists' Club, 52 East 41st St., New York 17, N. Y. Dinner 6:00 p.m.

Feb. 22, 1955. Chicago Chapter. Chicago Engineers Club. Cocktails, 6:00 p.m. Steak dinner ($3.25) 6:30 p.m. Speaker, Dr. Johan Bjorksten, Director of Research, Bjorksten Laboratories (Madison, Wis.), "Effective Use of Chemists." Reservations: Ruth Hutchinson, Ca-5-9600, ext. 662.

Feb. 24, 1955. New York Chapter. The New York Times Dining Room, 229 W. 43rd St., New York, N. Y. Dinner 6:00 p.m. Speaker: Dr. Randolph Major. Subject: "Advancing Yourself in Chemistry in the Pharmaceutical and Medical Fields." Question and answer period. Presiding Chairman, John Kotrady. Reservations ($2.75), Shepherd Stigman, Foster D. Snell, Inc., 29 W. 15th St., New York 11, N. Y.

Mar. 29, 1955. New Jersey Chapter. Field Trip to Bell Telephone Laboratories, Murray Hill, N. J. Meet at 1:45 p.m. in the Murray Hill Laboratory Auditorium. Following the tour, there will be a general meeting and dinner at a nearby restaurant to talk professional affairs and transact the annual business. Reservations: Dr. W. R. Sullivan, Hoffmann-LaRoche, Inc., Nutley, N. J. (Nutley 2-5000).

April 7. 1955. Pennsylvania Chapter. Dinner. Speaker, Dr. Mary Willard of the Dep't of Chemistry, The Pennsylvania State University, "Women in the Chemical Profession." For information: Dr. Robert Kunin, Rohm & Haas Co., Washington Square, Philadelphia 5, Pa.

April 13, 1955. National AIC Council and Board of Directors. The Chemists' Club, 52 East 41st St., New York 17, N. Y. Dinner 6:00 p.m.

April 15, 1955. Ohio Chapter. Annual Meeting. Mayflower Hotel, Akron, Ohio.

Apr. 28, 1955. New York Chapter. The New York Times Dining Room, 229 W. 43rd St., New York, N. Y. Dinner 6:00-7:30 p.m. Presentation of Awards to Student Medalists. Speaker Dr. A. W. Fisher, Jr., Arthur D. Little, Inc., "Algæ as a Potential Future Source of Food." Question and answer period. Presiding chairman, John Kotrady. Reservations ($2.75), Shepherd Stigman, Foster D. Snell, Inc., 29 W. 15th St., New York 11, N. Y.

May 5, 1955. Pennsylvania Chapter. Student Award Meeting.

May 11, 1955. National AIC Council and Board of Directors. The LaSalle Hotel, Chicago, Ill. Dinner 6:00 p.m.

May 11, 12, 13, 1955. AIC Annual Meeting. LaSalle Hotel, Chicago 2, Ill.

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AIC members who are seeking positions may place notices in this column without charge.

Positions Available

Manager of Photographic Research: Ph.D. in physical or organic chemistry. Minimum of fifteen years industrial experience in field, to include proven achievement in development of commercially useful photographic emulsions for paper and film sensitizing. Age 35-45. Salary around $15,000. Mid New York State. Box 11, THE CHEMIST.

Chemical Engineer: Seven to 12 years experience; research, processing, consulting and direct production in processing and large-volume chemicals, such as sulfuric acid, phosphates, silicates, potash and nitric acid. Midwest. Age 28-35. Salary $8,500 or better. Box 13, THE CHEMIST.

Chemists: Bachelor's or advanced degree for research in inorganic, physical and radio chemistry. Research experience is desirable.

Salesman: Science degree, with technical sales experience. To sell wide range of nuclear instruments and equipment. Must be willing to relocate.

The two preceding positions are in New England, salary dependent upon qualifications. Box 15, THE CHEMIST.

Chemist: Well grounded in organic chemistry. Good appearance and personality. Must be adaptable for position offering diversified duties. Knowledge of high polymers helpful. Age around 27. Mid New York State. Salary $6,000 or better. Box 17, THE CHEMIST.

Plastics Production Manager: Newly created position in pharmaceutical company desiring to produce plastic tubing for use with own products. Age thirty up, with degree in chemical or mechanical engineering preferred. Minimum of 5 years experience in plastics industry with good knowledge of extruded vinyl production. Salary open. Box 1-17, THE CHEMIST.

The following positions are open in metropolitan New York:

Ph.D. Biochemistry (1) 2-4 years exp. Specific training in colloid & physical chemistry $7-8,000. (2) **Nutrition or M.S.** (4 yrs. exp.), interested in Nutritional Research $5-6,500. Box 19, THE CHEMIST.

Ph.D. (3 yrs. exp.); **B.S.** (5 yrs. exp.) **Project leader,** fats, flavor stability & synthetic preparation. Thorough training in synthetic chemistry, $6,500-8,000. Box 1-1, THE CHEMIST.

Ph.D. (2 yrs. exp.); **B.S.** (5 yrs. exp.) Starch or protein chemistry. Supervisory and planning experience, $6,500-8,000. Box 1-3, THE CHEMIST.

Ph.D., physical chemistry, 3 yrs. exp. Rheology, gels, edible polymers. $6,500-8,000. Box 1-5, THE CHEMIST.

Ph.D. (2 yrs. exp.); **B.S.** (6 yrs. exp.) Food Technology or Agricultural Chemistry. Applied research, pharmaceuticals, food processing. Able to plan, organize and execute research. $6,500-8,000. Box 1-7, THE CHEMIST.

B.S. or B.Ch. E., or better: Industrial experience in coatings field, basic and applied research on resins and applications, some resin and polymer synthesis. Position involves research and production development work in the field of electrical insulating varnishes, etc. Metropolitan New Jersey, Age 26-38. $8-10,000. Box 1-9, THE CHEMIST.

Research & Pilot Plant Director: Chemical Engineering degree minimum. Experience in development and pilot plant operations in resin and foam plastics, sound machine shop, molding and general manufacturing experience. Able to solve basic production problems as well as interpret engineering diagrams and drawings. (Agency). Box 1-11, THE CHEMIST.

Sales-Technical: Background in Biotics with about 3 years selling experience in food industry. Travel after training. Age 30-40. Starting salary $650 per mo. (agency) Box 1-13, THE CHEMIST.

Jr. Buyer: B.S. in Ch.E. Young. Organic or biochemistry background. After training in New York, possibility of relocation. Salary to start $500 per mo. (Agency). Box 1-15, THE CHEMIST.

Chemists Available

Organic Chemist, Ph.D. Sixteen years research and development experience, eight years as supervisor in industrial organic chemistry. Responsible for two important new developments in past ten years. Box 12, THE CHEMIST.

Colloid Chemist, F.A.I.C., Competent scientist and administrator. Emulsions, waxes, surfactants, resins, insecticides, rheology. Seeks responsible position in small firm. Box 14, THE CHEMIST.

Technical Administrator. Chemist. 14 years experience in manufacture of organic chemicals and agricultural specialties. Ten years experience at management level as director of product development and director of research. Desires administrative position in product or market development division of expanding company. Box 16, THE CHEMIST.

Chemical Director. Broad up-to-date knowledge of new materials for product formulations. Experience covers many fields. Highly skilled in packaging design, labels and labeling claims. Box 18, THE CHEMIST.

For Your Library

Made in New Jersey

By John T. Cunningham, New Brunswick, N. J. Rutgers University Press. 1954. *IX & 260 pp.* $6.50.

The industrial story of a state has been portrayed in an interesting, readable manner. The book is a compilation of articles which appeared in the Magazine Section of the *Newark* (N. J.) *Sunday News*; and it is an integrated entity. Much research and visiting has gone into this work to develop both the historical and the current status of the industries.

The diversity of subject matter may be seen from the chapter headings; iron and steel, glass, leather, apparel, food, paper, jewelry, rubber, toys, brewing, textiles, ceramics, ships, explosives, paint, machinery, electricity, communications, non-ferrous metals, petroleum, automobiles, aircraft, measurement and control, chemicals, plastics, pharmaceuticals, radio and television, movies and phonograph, diversity —comprising a variety of other industries, and research. There are many illustrations, an extensive bibliography, and a full index.

This proved to be interesting reading as it appeared, and it was good to go over it again in book form. This background proved to be helpful when, as president of The American Institute of Chemists, this reviewer told about New Jersey's chemical industry on television. Those interested in the basic welfare of the state, as well as those interested in industrial technology should find this book of value for some years to come.

—DR. LINCOLN T. WORK, F.A.I.C.

Ionic Processes in Solution

By Ronald W. Gurney. McGraw-Hill Book Co. 275 *pp.* 6½" x 9¼". $6.50.

This is an exposition of theory and experimental results in solvents by methods of particle and continuum, containing much new matter. The newly coined concept, the "kome" may prove useful.

Electronic Absorption Spectroscopy in Organic Chemistry

An Introduction. By Gillam & Stern. St. Martin's Press, Inc. 283 *pp.* 5¾" x 9" $8.00.

Chiefly concerned with the absorption spectra between 2,000 and 10,000 Angstrom units of many organic compounds, the book contains some simple theory and applications, among which are the data for Vitamin A, chlorophyll, and organic compounds containing special groupings.

—DR. JOHN A. STEFFENS, F.A.I.C.

Please Note

In the Nov. 1954 issue of THE CHEMIST, a review was printed of *"Investigations of Rates and Mechanisms of Reactions.* Edited by S. L. Friess and Arnold Weissberger. Interscience Publishers, Inc." The book was listed as Volume III of the "Technique of Organic Chemistry" series, whereas, in actuality, this is Volume VIII of the series.

Chemical Books Abroad

Rudolph Seiden, F.A.I.C.

Verlag Chemie, Weinheim/Bergstr.: *Fortschritte der Verfahrenstechnik* 1952/53, by H. Miessner and U. Grigull; 1954, 496 pp. (76 ill., 18 tables); DM 39. — A new type of yearbook, full of practical information and valuable data — a collection of critical reviews of the progress made in industrial procedures and methods. The 28 chapters of the volume, contributed by experts in their respective fields, deal with such problems as molecular distillation, crushing, screening, extraction, gas absorption, adsorption, flotation evaporation, rectification, crystallization, lyophilizing, mixing, corrosion, measuring and regulating, etc. • *Justus von Liebig,* by Hertha von Dechen; 1953, 141 pp.; DM 8.40. — A unique autobiography — a compilation of letters written by Liebig, enlivened by replies of those to whom he wrote and by remarks of other contemporaries. Excellent reading for all interested in the life story of one of the most fascinating personalities and one of the greatest chemists of the 19th century.

Brandstetter Verlag, Wiesbaden: *Woerterbuch der industriellen Technik, Vol.* 3: *Deutsch-franzoesisch,* by Richard Ernst; 1954, 700 pp.; DM 24. — This German-French dictionary, listing 60,000 terms of industry and technic, is a companion volume to the German-English dictionary reviewed in the October, 1950, issue of THE CHEMIST. • *Das ABC der Welt-Organisationen,* by Will Grosse; 1954, 79 pp.; paper covers, DM 2.80. — A list of 300 abbreviations of international organizations — from ACWW to YWCA — with data concerning their purposes, leaders, addresses, etc.

Editio Cantor, Aulendorf i.Wuertt.: *Aminosaeuren,* by Hans Kohl; 1954, 210 pp.; DM 14.80. — An evaluation of the physiological and therapeutic importance of the various amino acids. A comprehensive, yet authoritative text which stimulates interest in the building stones of proteins. • *Rote Liste* 1954; 1008 pp. — An alphabetical listing (with information as to composition, indication, dosage and price) of more than 5,000 specialties, manufactured by members of the association of the German pharmaceutical industry.

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"Brady Write-On Labels." Information, samples. W. H. Brady Co., 727 West Glendale Ave., Milwaukee 12, Wis.

"Mineralight High Intensity Portable Black Light Inspection Lamp., Information. Ultra Violet Products, Inc., 145 Pasadena Ave., South Pasadena, Calif.

"Coleman Manual of Modern Instruments." Coleman Instruments, Inc., 318 Madison St., Maywood, Ill.

"Asco Stirring Rod Gland." Bronwill Scientific, Inc., 45 Russell St., Rochester 7, N. Y.

"Telstor, explosion-proof, Electronic Level Indicator." Information. Fielden Instrument Div., Robertshaw-Fulton Controls Co., 2920 No. 4th St., Philadelphia 33, Pa.

"Instrumentation". Order No. 111464. $2.00. Office of Technical Services, U. S. Dept. Commerce, Washington 25, D. C.

"Staff Publications 1945-1952." Polytechnic Institute of Brooklyn, Publications Committee, 99 Livingston St., Broooklyn 1, N. Y.

"Automatic Timer and Cycle Control Device". Information. Johnson Fare Box Co., 4619 No. Ravenswood Ave., Chicago 40, Ill.

"Glycerine Facts." Newsletter issued by Glycerine Producers' Association, 295 Madison Ave., New York 17, N. Y.

"Denver Samplers." Bulletin No. 81-Bd. Denver Equipment Co., P.O. Box 5268, Denver 17, Colorado.

"Pioneer and Pacemaker — The Story of Firestone." 64 pp. illustrated history. The Firestone Tire & Rubber Co., Akron 17, Ohio.

"Individual packets of buffer, dye, and fixative for the analysis of blood proteins on Spinco Paper Electrophoresis Apparatus." For information, Fisher Scientific, 717 Forbes St., Pittsburgh 19, Pa.

"New Plasticizer — BRC 21 Hydrocarbon for manufacture of phonograph records." Information. Barrett Div., Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y.

"New Vacuum Gauge Tube Resistant to Vibration." Information. Hastings Instrument Co., Inc., Hampton, Virginia.

"Automatic Loading Rack Flash Point Tester for Distillate Fuels." Bulletin No. 720, Precision Scientific Co., 3737 W. Cortland St., Chicago 47, Ill.

"Laboratory Glass Blowing With Pyrex Brand Glasses." 20-page pamphlet. Laboratory & Pharmaceutical Sales Dept., Corning Glass Works, Corning, N. Y.

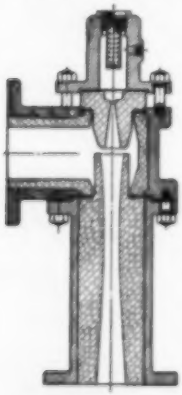
"Model 515 Alphatron Vacuum Gauge." Catalog sheet. Naresco Equipment Corp., 160 Charlemont St., Newton Highlands 61, Mass.

"Freeze-drying Units for Histological Studies." Bulletin No. 745, D. E. Stokes, F. J. Stokes Machine Coo., 5500 Tabor Rd., Philadelphia 20, Pa.

"Temperature Control System for Ultracentrifuge Rotors." Information. Specialized Instruments Corp., 699 O'Neill Ave., Belmont, Calif.

"Double-Capillary Manometer." Information folder. Bronwill Scientific Inc., 131 Gould St., Rochester 7, N. Y.

C-R EVACTOR Units Meet Corrosion Problems



The chemical industries are employing more and more Croll-Reynolds EVACTOR units in vacuum processes where corrosion resistance is a major consideration. These steam jet vacuum units provide pressures ranging from a few inches to a few microns. Croll-Reynolds is a pioneer in the use of new construction materials and our engineers are investigating corrosion problems continually.

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Specific Gravity 25°/15°C	1.100	
APHA Color—2 grams dissolved in 50 ml. alcohol	80	max.

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